Levels of understanding cat body language of Cat owners in Türkiye

Niveles de Comprensión del Lenguaje Corporal de Los Dueños de Gatos en Turquía

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ABSTRACT

The aim of this study was to reveal how much the expressions cats show using their bodies are understood by their owners. A face-to-face survey was conducted on 1,459 cat owners between the year of ages 18-65 and living in seven regions of Türkiye. The participants were determined from people who come to animal hospitals or pet clinics and have cats at home, and these people participated in the survey voluntarily. When the distribution of the participants according to regions is analysed, the highest participation was from the Central Anatolia Region with 42.83%. The age group with the highest participation was the 18-25 age group. Among the questions in the survey, the ones with the highest percentage of correct answers were "Extremely Terrified" and "Disgusted," while the question that received the most incorrect responses was "Anxious". The rates of correct responses were nearly identical for both women (48.95) and men (48.03%). Among the participants of the survey, only one person answered all questions correctly. The region with the highest percentage of correct answers is Central Anatolia. Kruskal-Wallis test was performed in order to reveal the difference in the correct answers about the body language of cats according to age. Cat owners are not sufficient to understand the body language of cats and for this reason, they need to be informed and trained by experts on the body language of cats. When the literature review was conducted on the understanding of cat body language by cat owners, no other study covering the whole of Türkiye was found.

Key words: Behaviour; Body language; Cat; Observation; Türkiye

RESUMEN

El objetivo de este estudio fue determinar en qué medida los dueños de gatos comprenden las expresiones corporales que estos muestran. Se realizó una encuesta presencial a 1,459 dueños de gatos entre 18 y 65 años de edad, residentes en las siete regiones de Turquía. Los participantes fueron seleccionados entre personas que asistían a hospitales veterinarios o clínicas para mascotas y que tenían gatos en casa; todos participaron de forma voluntaria. Al analizar la distribución regional de los participantes, la mayor participación provino de la Región de Anatolia Central (42,83%). El grupo etario con mayor representación fue el de 18 a 25 años. Entre las preguntas de la encuesta, las que obtuvieron el mayor porcentaje de respuestas correctas fueron "Extremadamente aterrorizado" y "Asqueado," mientras que la pregunta con más errores fue "Ansioso." Los porcentajes de respuestas correctas fueron casi idénticos entre mujeres (48,95%) y hombres (48,03%). Solo un participante respondió correctamente a todas las preguntas. La región con el mayor porcentaje de respuestas correctas fue Anatolia Central. Se realizó la prueba de Kruskal-Wallis para revelar la diferencia en las respuestas correctas sobre el lenguaje corporal de los gatos en función de la edad. Se concluyó que los dueños de gatos no comprenden suficientemente el lenguaje corporal de sus mascotas, por lo que necesitan ser informados y formados por expertos en este tema. En la revisión bibliográfica sobre la comprensión del lenguaje corporal felino en Turquía, no se encontraron estudios previos que abarcaran todo el país.

Palabras clave: Comportamiento; Lenguaje corporal; Gato; Observación; Turquía

INTRODUCTION

Cat owners generally express curiosity about understanding their cats' emotions [1]. While animals cannot communicate verbally with humans, they convey their feelings through non-verbal cues, including body language and facial expressions [2]. Understanding the signals that cats provide facilitates the establishment of a strong bond with them and paves the way for effective communication [3]. Cats seek to be understood by their owners through a range of visual cues involving their ears, tails, eyes, mouths, and whiskers. For instance, dilated pupils can indicate fear, interest, aggression, or excitement, while partially closed eyes suggest relaxation and affection [4]. A cat that holds its tail up expresses happiness and confidence, whereas a rapidly wagging tail indicates agression [5]. Cats with puffed-up tails held upright convey a sense of being large and impressive, while those with tails that curve like a question mark and are held upright express friendliness and curiosity [6].

Cats are not social animals that move in groups; instead, they behave individually. Their ability to adapt to home environments and communicate with humans contributes to their high demand as pets [7 , 8 , 9 , 10]. Cats can convey various signals using different parts of their bodies. Understanding their body language requires a detailed examination of each body part, such as the eyes, ears, tail, and whiskers [11 , 12].

Interactions with cats not only enhance their well-being but are also said to contribute economically [13]. In environments where cats live under good welfare conditions, stress related disorders such as vomiting, decreased appetite, and random urination/defecation are likely to decrease, thereby reducing the need for veterinary support and minimizing related costs [14]. Surveys and statistical studies in this field suggest that establishing positive interactions can lead to happier relationships [15]. It is noted that pets provide significant benefits, including reducing stress levels in humans, enhancing coping abilities in challenging life situations, and decreasing the likelihood of developing mental health disorders related to depression [16 , 17 , 18]. Various surveys and statistical studies have investigated the effects of cats on reducing human stress. When evaluated separately, these effects can be ranked as follows: 68% for cuddling, 67% for inducing laughter, and 61% for alleviating loneliness [19].

One of the easy ways to alleviate loneliness for humans is through the adoption of pets. Particularly after the COVID-19 pandemic, there has been an increase in the rate of cat adoptions as people seek companionship. In Türkiye, the cat population was reported to be 3.8 million in 2019, representing 10% of the population of 85 million; by 2023, the cat population increased to 4.6 million, with the proportion of cats kept as pets rising to 15% [20 , 21].

There are various studies conducted by researchers on cat behavior. Fawzy *et al.* [22] utilized the deep learning method YOLOv8 to understand cats' body language. This method involved calculating the positions of cats' mouths, tails, and eyes to assess their body postures through object recognition. Another study by Erten *et al.* [12] was conducted with 93 cat owners in Elazığ. In this study, cat owners were asked survey questions related to body language. The question that received the highest correct response rate was "disgusted," with an accuracy of 84.9%, while the question with the lowest correct response rate was "excited," at 19.4%. In another study, Van Belle *et al.* [23] conducted a survey supported by videos taken by cat owners. This research evaluated behaviors such as head rubbing, allogrooming, sleeping together, tail-up greetings, and playfulness. The behavior most frequently misinterpreted by participants was head rubbing, followed by allogrooming.

This study aims to determine the socio-demographic characteristics of cat owners in Türkiye and the extent to which they understand the body language of the cats they keep at home. There is no other study in the literature covering the whole of Türkiye.

MATERİALS AND METHODS

The material of the study consisted of the data obtained from 1,459 randomly selected individuals aged between 18 and 65, living in different regions of Turkey (Aegean, Central Anatolia, Marmara, Eastern Anatolia, South Eastern Anatolia, Mediterranean and Black Sea regions), who responded to a face-to-face and online questionnaire. 645 men and 814 women participated in the study.

The survey was conducted between July and October 2024. In order to carry out the study, support was received from the students of the Veterinary Medicine Department of Selcuk University Karapınar Aydoğanlar Vocational School and the people who would participate in the survey were reached.

According to European Pet Food Industry Federation (FEDIAF) [21], the number of individuals who own cats and dogs in Turkey is 4,660.00. Given that all the answers given by cat owners are equally important and have an equal chance of being correct, the "Simple Random Sampling" method was selected. Accordingly, when the sample size with a 95% confidence interval and a 5% margin of error was calculated, it was determined that a minimum of 384 participants would be required.

The 3 questions in the first part of the questionnaire were used to analyse the socio-demographic structure and the 20 questions in the second part were used to measure the extent to which the body language of cats could be understood by their owners. The questions posed to the participants of this study consisted of four possible answers, of which only one was correct. The participants were presented with images of cats and requested that they select one option that best represented the image. Chin [24] was used for the questions of the questionnaire form applied to understand the body language of cats. In addition, the questions used in the questionnaire study have been used in other similar studies [12 , 25]. Given the non-parametric nature of the data and the presence of categorical variables, it was deemed appropriate to undertake the Mann-Whitney U and Kruskal-Wallis tests. These tests facilitate the determination of statistically significant differences between groups. Subsequent post hoc analyses are required to identify the groups that are distinguishable. Consequently, the Tamhane post hoc test was employed, a method that is utilised in scenarios where variance homogeneity is not attained, yet it offers reliable results in multiple comparisons [26].

RESULTS AND DİSCUSSİON

The age distribution of participants by gender is given in TABLE I. The highest participation rate was among women aged 18-25, followed by men aged 18-25.

TABLE I. Distribution of participants by age		
Age range	Male	Female
18-25	413	574
26-35	108	125
36-45	39	75
46-55	30	32
56-65	55	8
Total	645	814

The age distribution of the participants by region is given in TABLE II. The highest participation in the survey was among women and men aged 18-25 in the Central Anatolia Region. The lowest participation was among participants aged 46-55 in the Southeastern Anatolia region.

TABLE II. Distribution of participants' ages according to regions								
		Aegean	Central Anatolia	Marmara	Eastern Anatolia	Southeastern Anatolia	Mediterrenian	Black Sea	Total
Male	18-25	48	186	41	23	38	55	22	413
	26-35	5	59	11	4	7	10	12	108
	36-45	3	11	6	5	3	6	5	39
	46-55	6	16	1	2	0	4	1	30
	56-65	11	9	6	7	4	13	5	55
Female	18-25	48	221	78	35	43	81	68	574
	26-35	11	56	10	15	3	21	9	125
	36-45	5	45	5	4	5	7	4	75
	46-55	0	18	6	2	0	3	3	32
	56-65	2	4	1	1	0	0	0	8

The question that participants answered most correctly was "Extremely terrified" and the question they answered least correctly was "Anxious". The number of correct answers to the question "extremely terrified" was given by 562 males (87.13%) and 725 females (89.07%). The number of incorrect answers to the question "anxious" was given by 551 males (85.43%) and 739 females (90.66%). The percentages of correct and incorrect answers given to the other questions are given in TABLE III by gender. There was only one person in the 18-25 age group who answered all questions correctly.

In this study, when evaluating the correct responses from women (48.94%) and men (48.18%), it was found that both genders exhibited nearly the same rate of correct answers. Köseman *et al.* [27] also noted that women provided more correct answers.

The percentage of correct answers to the questions was calculated according to age groups and is presented in TABLE IV. Accordingly, the 10th and 11th questions were the most answered correctly by both genders. Participants correctly marked "Extremely Terrified" for question 10 and "Disgusted" for question 11. In the calculation made without age group, question 10 was determined to be the question with the most correct answers.

TABLE III. Response rates for cats' body language				
Images	Male (%)		Female (%)	
	True	False	True	False
Interested	38.60	61.40	37.35	62.65
Attentive	47.60	52.40	58.85	41.15
Friendly	77.05	22.95	82.92	17.08
Content	42.95	57.05	44.23	55.77
Relaxed	17.52	82.48	19.53	80.47
Predatory	51.32	48.68	55.53	44.47
Conflicted	46.20	53.80	48.28	51.72
Frightened	60.78	39.22	66.34	33.66
Trusting	45.27	54.73	42.14	57.86
Super terrified	87.13	12.87	89.07	10.93
Disgusted	56.59	43.41	72.24	27.26
This is mine	56.28	43.72	37.96	62.04
Playful	54.57	45.43	52.21	47.79
Excited	40.62	59.38	38.70	61.30
Relaxed	45.89	54.11	44.35	55.65
Anxious	59.69	40.31	60.20	39.80
Worried	15.66	84.34	13.39	86.61
Threatened	65.58	34.42	65.36	34.64
Terrified	39.85	60.16	40.91	59.09
Irritated	14.42	85.43	9.34	90.66

TABLE IV. Questions with the highest number of correct answers and their rates according to gender and age groups			
	Age	Percent (%)	Questions
Male	18-25	82.08	11
	26-35	85.19	10 – 11
	36-45	87.18	10 – 11
	46-55	90.00	11
	56-65	12.73	11
Female	18-25	92.33	11
	26-35	88.88	11
	36-45	92.00	11
	46-55	93.75	11
	56-65	87.50	10

In the study conducted by Köseman *et al.* [27], the question that participants answered correctly the most closely mirrored those in this study, with the responses "Extremely Terrified" and "Disgusted" being the most common.

When TABLE V is examined, according to the results of the analysis of the difference between the correct answers given to the questions about the body language of cats according to age, a significant difference was found between the ages (P<0.05). According to the results of the *Post-Hoc* analysis performed to determine the difference between the ages of this variable, it was found that there was a difference between the ages of 18-25 and 36-45 (P=0.037), 18-25 and 46-55 (P=0.024) and 18-25 and 56-65 (P=0.016). This variation may be attributed to familiarity, awareness, or enhanced observational skills of individuals in different age groups regarding cat behavior.

TABLE V. Kruskal-Wallis test values for the difference of cat body language parameter according to age							
Age range	18-25	26-35	36-45	46-55	56-65	P	Different
	684±637.83	166.93±185.98	82.07±108.99	43.36±54.09	79±17.64	.000	1-3
							1-4
							1-5

1: 18-25, 2: 26-35, 3: 36-45, 4: 46-55, 5: 56-65

TABLE VI. Kruskal-Wallis test values for differences in body language parameters of cats according to regions								
Regions	Med	EA	A	SA	CA	BS	M	p
	180,50±267.75	83.30±119.14	110.60±154.74	94.10±152.80	638.30±805.68	102±173.65	169.80±260.10	.0507

BS: Black Sea, CA: Central Anatolia, EA: Eastern Anatolia, E: Aegean, M: Marmara, MED: Mediterranean, SA: Southeastern Anatolia

When the TABLE VI is examined, according to the results of the analyses on the difference of cat body language variable according to regions, no statistically significant difference was found between the regions (P<0.05).

TABLE VII. Mann-Whitney-U test values for the difference of cat body language parameter according to age			
Sex	Male	Female	P
	159.890 ± 335.135	234.57 ± 432.427	.676

When TABLE VII is examined, according to the results of the analyses on the difference of cat body language variable according to age, no statistically significant difference was found between genders (P<0.05).

The preponderance of Central Anatolia in participation rates can be ascribed to the region's level of urbanization, accessibility to educational resources, and the presence of major universities where veterinary and animal sciences are actively pursued.

Studies involving vocal and visual expressions of cats have shown that women tend to give higher rates of correct responses [28 , 29]. The fact that women give more correct answers in part is attributed to their greater communication and interaction with babies. The different results found across studies may be attributed to the similarity of interests among participants and the design of questions that do not emphasize gender differences [30 , 31 , 32].

It is suggested that the significant majority of participants answering the 11th question correctly may be related to the more intense visual reactions exhibited by cats. Additionally, the similarity between the way humans express their reactions—through facial expressions—toward food items they dislike and the way cats respond may have facilitated the participants' ability to provide the correct answer.

According to TABLE V, the difference detected between correct answers and age can be attributed to individuals in age groups being more familiar with cat behavior, their awareness or their advanced observation skills.

CONCLUSİON AND RECOMENDATIONS

This study found that there was a difference between the age of cat owners and their level of understanding of cat body language. It was also found that there was no statistically significant difference in the rate of correct answers according to age and region. The questions that participants answered most correctly were "extremely frightened" and "anxious".

Since cats have many expressions that need to be monitored and evaluated, it is recommended that owners receive training in cat behavior. Cats with owners who understand them better will have increased happiness, peace and well-being. Communication between cats and their owners will improve and the bond between them will be strengthened. The reduction in stress levels in cats with better understanding will strengthen their immune systems and make them more resistant to other physiological and metabolic disorders. Understanding body language will reduce punitive approaches and behavioral problems and increase the level of trust in cats in their owners.

Findings from studies conducted so far suggest that when cat owners are asked to respond to cat behavior based solely on visual cues and shapes, accuracy levels are relatively low. Therefore, future research examining human-cat interactions should include auditory signals and chemical cues in addition to visual and shape-based assessments to obtain more comprehensive results.

Financial support

Conflict of Interest

The authors declared that they have no conflict of interest.

Ethical Statement

This study was approved by the Selcuk University Animal Experiments Local Ethics Committee (Approval no: 01.10.2024/11).

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